

University of Groningen

Improving self-management in insulin-treated adults participating in diabetes education. The role of overprotection by the partner

Hagedoorn, M.; Keers, J.C.; Links, T.P.; Bouma, J.; ter Maaten, J.C.; Sanderman, R.

Published in:
Diabetic Medicine

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2006

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Hagedoorn, M., Keers, J. C., Links, T. P., Bouma, J., ter Maaten, J. C., & Sanderman, R. (2006). Improving self-management in insulin-treated adults participating in diabetes education. The role of overprotection by the partner. *Diabetic Medicine*, 23(3), 271-277.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Improving self-management in insulin-treated adults participating in diabetes education. The role of overprotection by the partner

M. Hagedoorn*, J. C. Keerst†‡ T. P. Linkst, J. Bouma*, J. C. Ter Maaten‡§ and R. Sanderman*

*Northern Centre for Health Care Research, Department of Public Health and Health Psychology, University of Groningen, †Department of Endocrinology, University Medical Center Groningen, ‡Academic Rehabilitation Centre Beatrixoord, Haren and §Department of Internal Medicine, University Medical Center Groningen, the Netherlands

Accepted 1 July 2005

Final Acceptance 19 July 2005

Abstract

Aims To examine the role of overprotection by the partner—i.e. excessive protection, unnecessary help, excessive praise for accomplishments, or attempts to restrict activities as a consequence of underestimating the patient's capabilities—in changes in patient self-management in the context of diabetes education.

Methods Sixty-seven insulin-treated patients with a partner completed questionnaires on admission to a Multidisciplinary Intensive Education Programme (MIEP) and 3 months after completing the core module of MIEP. Factors assessed were overprotection by their partner and three aspects of diabetes self-management, namely internal locus of control, diabetes-related distress and HbA_{1c}. Regression analyses were used to test the independent associations of patient sex, baseline overprotection and the interaction between sex and overprotection with diabetes self-management at the follow-up stage, controlling for the baseline value of the dependent variable.

Results The increase in internal locus of control and decrease in HbA_{1c} were both significantly less for female patients who perceived their partner to be rather overprotective than for female patients who did not perceive their partner to be overprotective. The more patients, both male and female, perceived their partner to be overprotective, the less their diabetes-related distress decreased.

Conclusions Overprotection by the partner showed a negative association with improvement in diabetes self-management, especially for female patients. Thus, an intervention programme with the aim of reducing overprotection by the partner, or the perception of this, may enhance self-management in patients participating in diabetes education.

Diabet. Med. 23, 271–277 (2006)

Keywords diabetes education, diabetes self-management, insulin-treated adults, overprotection, partners

Abbreviations MIEP, Multidisciplinary Intensive Education Programme; PAID, The Problem Areas In Diabetes

Introduction

Good diabetes self-management is of crucial importance in preventing serious long-term complications. Unfortunately, only a small number of patients (16%) reach optimal glycaemic control (i.e. HbA_{1c} < 7.0%) and about a quarter have poor

Correspondence to: Mariët Hagedoorn, Northern Centre for Healthcare Research, Department of Public Health and Health Psychology, University of Groningen, PO Box 196, 9700 AD Groningen, the Netherlands. E-mail: m.hagedoorn@med.umcg.nl.

control (i.e. $HbA_{1c} > 10.0\%$) [1–3]. Patients may also develop psychosocial problems [1,2,4–6]. In addition to the patient's own knowledge, skills and motivation, the patient's family system, especially the partner (i.e. the spouse or life partner with whom the patient shares a household), is an important factor in influencing whether adult patients can successfully make and maintain the (lifestyle) changes that are needed for good glycaemic control [7–11]. Fisher *et al.* identified several reasons for paying more attention to family factors in diabetes management [9]. First, most of the self-management behaviour takes place within the family or home. Second, the family and particularly the partner can have an enormous supportive, but also deleterious, effect on patient behaviour and well-being. Third, self-care behaviour is often seen as patient behaviour but is frequently the result of the combination of efforts to cope by both the patient and the partner (i.e. dyadic coping [12]).

Previous research has found that more family support and less conflict and over-involvement by the partner (e.g. intrusive behaviour and exaggerated emotional responses) was associated with better treatment adherence, illness adaptation [9,10,13–15] and glycaemic control [14,16] in adults. Other studies have shown that more overprotection by the partner—i.e. excessive protection, unnecessary help, excessive praise for accomplishments, or attempts to restrict activities as a consequence of underestimating the patient's capabilities—is accompanied by less relationship satisfaction and less control and self-efficacy in patients with chronic disease [17–19]. Although the observed cross-sectional associations described above are interesting, longitudinal studies are important in providing more insight into associations between family factors and *improvement* in diabetes self-management, such as diabetes-related distress and glycaemic control. Family factors were reported to be associated with some, but not all, of the outcomes measured in the few reported longitudinal studies. Chesla *et al.* [20], for example, showed that unresolved conflict in European American couples was associated with a poorer dietary intake 1 year later, but not with diabetes-related quality of life, physical activity or HbA_{1c} . Trief *et al.* [21,22] reported that marital satisfaction was associated with diabetes-related quality of life and distress 2 years later, but not with positive and negative mood, self-care behaviour or HbA_{1c} . One explanation for the rather weak support for an association between family factors and change in diabetes self-management may be that patients in these studies had diabetes for at least 1 year and often for many years. It is likely that they had reached a stable, either good or poor, self-management routine. For this reason, the present longitudinal study focused on adult patients with persistent diabetes problems who were especially motivated towards improving their self-management routines. More specifically, this study examined associations between overprotection by the partner and changes in self-management in insulin-treated patients in the context of diabetes education.

Patients who appear to benefit insufficiently from regular care and show enduring problems in handling their diabetes

may benefit from additional intensive self-management education. The Multidisciplinary Intensive Education Programme (MIEP) at the Academic Rehabilitation Centre Beatrixoord aims to empower patients to manage their own diabetes [23,24]. The empowerment approach focuses on overcoming attitudinal and motivational barriers, improving self-management skills, and stimulating feelings of control and self-efficacy [25,26]. It is expected that patients who participate in MIEP will achieve less improvement in diabetes self-management outcomes, including internal locus of control, diabetes-related distress and HbA_{1c} , if their partner is perceived to be more rather than less overprotective. This expectation is first of all in line with the negative associations found between overprotection and control and self-efficacy [17,19] and between over-involvement and distress [15]. Secondly, overprotection communicates low trust in the patient's coping abilities and in his or her self-care behaviour, which is the exact opposite of the message communicated by MIEP. In other words, if the partner is overprotective, the relational context is inconsistent with the empowerment approach. Assuming that the empowerment approach is generally effective, improvement is expected in individuals where the level of overprotection is low. Female patients especially are expected to be influenced by their partner's overprotection, because prior research indicates that women are more strongly influenced by marital experiences and partner behaviour than are men [27–32]. In summary, the hypotheses to be tested are:

- (i) Patients, especially females, who perceive their partner to be rather overprotective when commencing MIEP will show less increase in internal locus of control than patients who perceive their partner to be little overprotective.
- (ii) Patients, especially females, who perceive their partner to be rather overprotective when commencing MIEP will show less decrease in diabetes-related distress and HbA_{1c} than patients who perceive their partner to be little overprotective.

Patients and methods

Participants and procedure

All 157 patients who commenced MIEP from March 2001 to August 2003 were invited to participate in the study. Patients were referred to MIEP by their physicians from several hospitals in the north of the Netherlands [33]. An analysis of the patient's problems was made during an extensive admission interview at the rehabilitation centre by, among others, a psychologist and a diabetes nurse. Inclusion criteria for admission to MIEP were (i) self-management difficulties—i.e. $HbA_{1c} > 8.0\%$, number of hypoglycaemic episodes per month ≥ 10 , or one or more severe hypoglycaemic episodes per month as reported by the patient's physician—or diabetes-related distress, as reported by the physician and assessed by the psychologist, persisting for at least 1 year, (ii) between 18 and 75 years of age, (iii) no severe physical or mental comorbidity, and (iv) in command of the Dutch language. Patients referred to MIEP had persistent diabetes problems, despite intensive attention in regular diabetes care.

Spontaneous improvement for these patients was therefore unlikely, which was supported by their HbA_{1c} values for the year preceding intake to MIEP [24]. The baseline questionnaire (T1) was completed during the day on which patients had their admission interviews. This was approximately 1 week before they commenced MIEP. A follow-up questionnaire was sent to the patient's home address 3 months after completion of the core module of MIEP (T2). The study was approved by the Institutional Review Board of the University Medical Center Groningen, the Netherlands.

Self-management programme

MIEP consists of 10 weekly 1-day sessions and two booster sessions taken 6 and 12 weeks after the core module [23]. It aims to empower patients to set and achieve their own treatment goals. In doing so, MIEP uses a four-phase learning sequence in which a variety of topics are highlighted, including self-monitoring, diet, exercise, foot care, daily activities and employment, psychosocial aspects of diabetes and behavioural coping strategies. A topic is first introduced, followed by group discussion or practice as a second phase. Patients set themselves goals and plan how to fit a certain aspect into their daily lives in the third phase. The fourth phase is evaluation of the progress achieved. Several topics are considered during each session and the sequence of four phases takes several sessions for every topic. Groups are formed with six to nine patients and the diabetes education team is interdisciplinary.

Measures

All variables under study were measured at both T1 and T2.

Overprotection

Overprotection was assessed with a scale that has been used in several studies on couples dealing with illness [17–19]. The six items include, for example, 'My partner continuously keeps an eye on me' and 'When it comes down to it, my partner seems to think that he or she can't leave my diabetes self-management to me'. The possible answers ranged from 1 (never) to 5 (very often) and a sum score within subjects was calculated. The internal consistency (Cronbach's α) was 0.75 and 0.69 at T1 and T2, respectively, and the Pearson correlation between T1 and T2 overprotection was 0.64 ($P < 0.001$).

Internal locus of control

Internal locus of control was measured using a subscale of the specific-condition health locus of control scale developed by Wallston *et al.* [34]. The six items assess the extent to which patients perceive their diabetes control to be dependent on their own behaviour. Although health locus of control is usually viewed as a trait-like characteristic, health control beliefs can change with experience, especially when individuals are systematically exposed to experiences designed to alter their beliefs [34]. The item scores were summed into a single score (theoretical range: 0–30), with higher scores indicating a stronger internal locus of control. The value of Cronbach's α was 0.69 and 0.76 at T1 and T2, respectively, and the Pearson correlation between T1 and T2 control was 0.41 ($P = 0.001$).

Diabetes-related distress

The Problem Areas In Diabetes (PAID) scale was used to assess diabetes-related distress [35,36]. The 20 items were summed into one diabetes-related distress score. This sum score was transformed into a scale ranging from 0 to 100, with a higher score indicating more distress. The value of α was 0.93 and 0.94 at T1 and T2, respectively. The Pearson correlation between T1 and T2 distress was 0.56 ($P < 0.001$).

Glycaemic control

Glycaemic control was assessed by means of HbA_{1c} (Bio-Rad HPLC, Munich, Germany: 4.3–6.1%). T1 and T2 HbA_{1c} were 0.58 ($P < 0.001$) correlated.

Data analysis

Changes between T1 and T2 were first examined by means of paired *t*-tests. Effect sizes (*d*) are presented; 0.20 = a small, 0.50 = a medium, and 0.80 = a large effect [37]. Bivariate relations between the variables under study were then investigated. Finally, linear regression analyses were performed to determine whether changes in internal locus of control, diabetes-related distress and HbA_{1c} were related to perceived overprotection at T1, possibly in interaction with sex. Age, education, duration of the relationship, diabetes type and diabetes duration were tested for inclusion as control variables. We followed the procedure suggested by Aiken and West [38]. The baseline value of the outcome variable and control variables (where necessary) were entered in the first step of the regression analyses. Sex, overprotection and the interaction between sex and overprotection were entered in consecutive steps after this. The multiplicative function was computed as the product of a dummy variable (sex: -1 = male, 1 = female) and the 'centred' (i.e. deviation from the mean) scores on overprotection. Unstandardized regression weights are reported because the regression equations contain interactions. Following Cohen [37], $\Delta R^2 = 0.02$ (i.e. $f^2 = 0.02$) represents a small effect, $\Delta R^2 = 0.13$ (i.e. $f^2 = 0.15$) a medium effect, and $\Delta R^2 = 0.26$ (i.e. $f^2 = 0.35$) a large effect. Significant interactions were plotted to interpret whether the effects were consistent with the hypotheses. Specifically, as suggested by Aiken and West [38], simple regression lines were drawn for female and male patients, respectively. The predicted values on the outcome variable were computed on the basis of the scores on overprotection (mean ± 1 SD) and sex (male = -1 , female = 1), at the average level of the outcome variable at T1. Additional analyses were conducted to test the statistical significance of the simple slopes [38].

Results

Patient characteristics

Of the patients admitted to MIEP, 138 (88%) completed the programme—10 male and eight female patients dropped out and one male patient died—and 126 (91%) of these patients participated in the research. Of these, 90 (71%) were married or shared a household with their partner, seven (6%) had a partner with whom they did not share a household, and 29

(23%) did not have a partner. For the present study, we selected the subsample of 67 patients who were married or had been living with their heterosexual partner for at least 1 year and who participated at both T1 and T2—i.e. at least one of the outcome measures at T2 was available. *T*-tests revealed that, at baseline, the 23 patients with a partner who dropped out of the study between T1 and T2 did not differ from the 67 patients who remained in the study with respect to demographic and medical variables, overprotection and the diabetes self-management variables under study.

There were 32 male and 35 female patients with a mean age of 45.4 years ($SD \pm 10.6$), all taking insulin. Most participants were married (81%) and another 19% were living with their partner. The mean relationship duration was 21.0 years ($SD \pm 10.1$, range: 2–41 years). About 9% had completed primary school only, 22% had completed secondary or vocational education at the lowest level and 48% at the intermediate level, 3% had completed secondary education at the highest level and 18% had completed higher vocational education or university. Patients with Type 1 diabetes (67%) were younger (mean $\pm SD$; 42.2 ± 10.5 vs. 50.6 ± 8.6 years), $t(61) = -3.15$, $P = 0.002$, and had a longer diabetes duration (18.5 ± 13.2 vs. 11.1 ± 6.9 years), $t(61) = 2.93$, $P = 0.01$, than patients with Type 2 diabetes. Patients with Type 1 diabetes also had a higher level of formal education than patients with Type 2 diabetes: the median was 5 (i.e. vocational education at the intermediate level; interquartile range = 4–5.25) vs. 3 (vocational education at the lower level; interquartile range = 1–5). A Chi-square test revealed a linear effect, $\chi^2(1, n = 61) = 7.09$, $P = 0.01$.

Changes between T1 and T2

Perceptions of overprotection decreased between T1 and T2, $t(60) = 2.27$, $P = 0.03$, $d = 0.25$ (11.2 ± 3.7 vs. 10.3 ± 3.3).

Diabetes-related distress decreased from 40.6 ± 21.3 to 27.2 ± 17.7 , $t(60) = 5.62$, $P < 0.001$, $d = 0.68$, and HbA_{1c} decreased from 8.4 ± 1.1 to $8.0 \pm 1.1\%$, $t(63) = 3.32$, $P = 0.002$, $d = 0.38$. Internal locus of control did not increase between T1 and T2, $t(60) = -1.05$, $P = 0.30$, $d = 0.15$ (19.7 ± 4.7 vs. 20.4 ± 4.8).

Bivariate relations

Male patients perceived their partner to be more overprotective (12.9 ± 4.2 vs. 9.9 ± 3.3 at T1), $t(65) = 3.24$, $P = 0.002$, and they reported a stronger internal locus of control (21.0 ± 4.3 vs. 18.8 ± 4.6 at T1), $t(65) = 1.99$, $P = 0.05$, than did female patients. Similar *t*-values were found at T2 for these variables. No other significant differences between males and females were found. Table 1 shows correlations for all except the binominal variables under study. Except for gender, none of the demographic and medical variables were related to overprotection or to the three outcome variables, indicating that these variables do not need to be included as control variables in the regression analyses. Overprotection and the outcome variables were not significantly correlated at a bivariate level, with the exception of a positive correlation between overprotection and internal locus of control at T1 (Pearson $r = 0.26$, $P = 0.03$).

Baseline overprotection and changes in diabetes self-management outcomes

The first regression analysis revealed an interaction effect between sex and baseline overprotection on internal locus of control at follow-up, controlling for the baseline value of control (see Table 2). Female patients showed a smaller increase in locus of control if they perceived their partner to be relatively overprotective (Fig. 1), which is as expected from hypothesis 1.

Table 1 Correlations (*P*-value) between the variables under study

Variables	1	2	3	4	5	6	7	8
1 Age	—	−0.24 (0.05)	0.70 (< 0.001)	0.13 (0.32)	−0.12 (0.32)	−0.08 (0.53)	−0.03 (0.81)	0.04 (0.73)
2 Education†		—	−0.05 (0.67)	0.22 (0.07)	0.13 (0.29)	0.12 (0.35)	0.12 (0.34)	−0.11 (0.40)
3 Relationship duration			—	0.08 (0.51)	−0.08 (0.51)	−0.11 (0.38)	0.14 (0.27)	0.14 (0.28)
4 Diabetes duration				—	0.06 (0.62)	−0.02 (0.88)	−0.10 (0.42)	0.13 (0.31)
5 Partner overprotection	0.06 (0.66)	−0.06 (0.65)	0.03 (0.80)	−0.15 (0.23)	—	0.26 (0.03)	0.04 (0.74)	0.23 (0.06)
6 Internal locus of control	0.03 (0.79)	0.24 (0.07)	−0.07 (0.58)	0.02 (0.91)	0.16 (0.22)	—	−0.10 (0.43)	−0.05 (0.69)
7 Diabetes-related distress	0.04 (0.74)	0.04 (0.79)	0.12 (0.35)	−0.01 (0.92)	0.14 (0.27)	−0.22 (0.09)	—	0.04 (0.75)
8 HbA_{1c}	−0.00 (0.99)	−0.03 (0.81)	0.02 (0.87)	0.09 (0.48)	−0.04 (0.79)	−0.20 (0.13)	0.23 (0.09)	—

†Education was assessed on a scale from 1 = primary school to 8 = university degree.

Correlations between T1 variables are presented above the diagonal and correlations between T2 variables are presented below the diagonal. All correlations are Pearson correlations, except those with respect to education, which are Spearman correlations. Due to missing values, *n* varies from 59 to 67.

Table 2 Results of the regression of internal locus of control, diabetes-related distress and HbA_{1c} on patient sex, partner overprotection and sex by overprotection, controlling for the baseline value of the outcome variable

Step and variable	Change statistics			Coefficient		
	ΔR^2	ΔF	sig. ΔF	b^\dagger	T	sig. t
Internal locus of control (T2) analysis						
1 T1 Internal locus of control	0.17	11.71	< 0.001	0.33	2.17	0.01
2 Patient sex	0.03	2.14	0.15	-1.19	-2.05	0.05
3 T1 Overprotection	0.04	2.59	0.11	-0.25	-1.53	0.13
4 Sex by overprotection	0.08	6.45	0.01	-0.41	-2.54	0.01
Diabetes-related distress (T2) analysis						
1 T1 Diabetes-related distress	0.31	26.94	< 0.001	0.44	5.06	< 0.001
2 Patient sex	0.01	0.68	0.42	7.11	1.77	0.08
3 T1 Overprotection	0.07	6.32	0.02	1.36	2.49	0.02
4 Sex by overprotection	0.00	0.00	0.99	-0.01	-0.02	0.99
HbA _{1c} (T2) analysis						
1 T1 HbA _{1c}	0.34	31.46	< 0.001	0.57	5.47	< 0.001
2 Patient sex	0.01	0.62	0.43	-0.04	-0.37	0.72
3 T1 overprotection	0.01	0.70	0.41	0.04	1.22	0.23
4 Sex by overprotection	0.06	5.92	0.02	0.07	2.43	0.02

$^\dagger b$ is the unstandardized regression coefficient in the final model.

n varies as a result of missing values; internal locus of control analysis, $n = 61$; diabetes-related distress analysis, $n = 61$; HbA_{1c} analysis, $n = 64$.

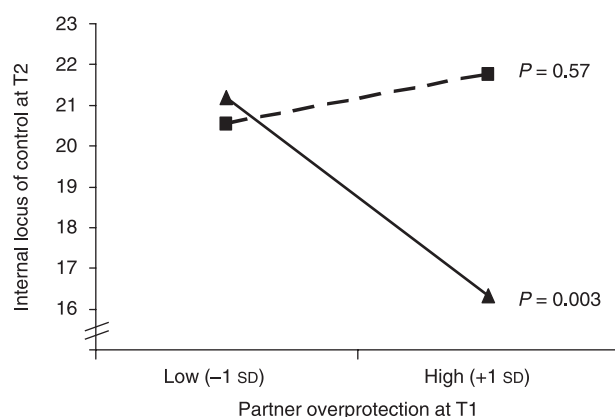


Figure 1 The interactive effect of baseline overprotection and sex (■, male; ▲, female) on internal locus of control at T2, controlling for internal locus of control at baseline. The mean for the baseline internal locus of control is 19.7.

Overprotection was not associated with a change in internal locus of control for the male patients.

There was no interaction effect between sex and overprotection with respect to diabetes-related distress. Importantly, the results did reveal a main effect of baseline overprotection. In partial support of hypothesis 2, regardless of sex, the more patients perceived their partner to be overprotective, the smaller the decline in distress. The results revealed an interaction effect between sex and overprotection with respect to HbA_{1c}. Female, but not male, patients who perceived their partner to be relatively overprotective at baseline showed a smaller decline in HbA_{1c} (see Fig. 2), which is as expected from hypothesis 2.

A decrease in distress was significantly related to an increase in internal locus of control (Pearson $r = -0.30$, $P = 0.02$), but

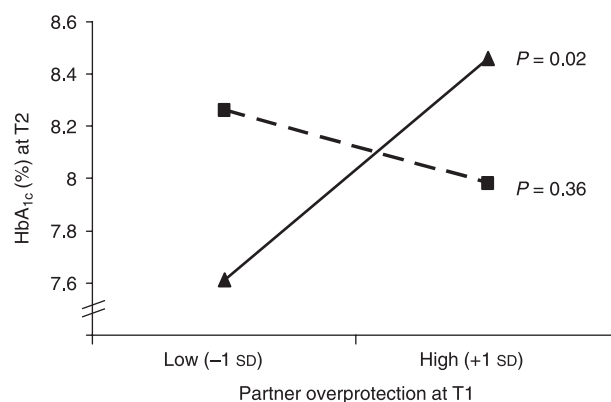


Figure 2 The interactive effect of baseline overprotection and sex (■, male; ▲, female) on HbA_{1c} at T2, controlling for HbA_{1c} at baseline. The mean baseline HbA_{1c} is 8.4.

the association between overprotection and improvement in distress was not mediated by an increase in internal locus of control. Although the interactive effects of sex and overprotection on internal locus of control and HbA_{1c} had similar forms, improvements in both outcome variables were not related (Pearson $r = -0.13$, $P = 0.34$), indicating that internal control did not mediate the interactive effect on HbA_{1c}. Decreases in diabetes-related distress and HbA_{1c} were also unrelated (Pearson $r = -0.02$, $P = 0.86$).

Discussion

The main finding of this study is that patients' perception of overprotection by their partner was associated with improvement in diabetes self-management, especially for female

patients. Noteworthy, overprotection was associated with improvement in psychosocial aspects of diabetes self-management as well as improvement in glycaemic control. More specifically, female patients, who perceived their partner to be relatively overprotective before they entered the education programme, showed a significantly smaller increase in internal locus of control and a significantly smaller decrease in HbA_{1c}. In addition, regardless of sex, patients who perceived their partner to be relatively overprotective showed a significantly smaller decrease in diabetes-related distress.

The associations between overprotection and improvement in diabetes-related distress and glycaemic control were not mediated by an increase in locus of control. Several previous studies found similar non-significant associations between glycaemic control and psychological factors (for example, [39]). This is not surprising because glycaemic control is strongly influenced by many other factors, including interrelated self-care behaviours. Previous research has shown that a conflict in the family environment may impede the patient's ability to maintain daily self-care practices [32], so improvement in self-care behaviour may be an important mediator of the relationship between low overprotection and improvement in glycaemic control found in female patients. In addition, family relations marked by conflict or hostility may have a direct, negative effect, especially on the physiology of a female patient [32]. It is possible that overprotection causes more physiological stress reactions in female than in male patients, making it more difficult for women to improve their glycaemic control.

Although previous findings concerning cross-sectional associations between family factors and HbA_{1c} have been inconsistent, associations between family factors and distress and other diabetes self-management variables are often reported [9,10,13–16]. However, in this study, overprotection and diabetes self-management variables were not related cross-sectionally, with the exception of the unexpected positive correlation between overprotection and internal locus of control at baseline. This may indicate that patients who feel in control tend to perceive their partner as being more overprotective. One explanation for the divergent cross-sectional findings found here may be that the study focused on patients with self-management difficulties, as opposed to adults with diabetes in general, as was the case in other studies.

It is important to note some limitations of this study when interpreting the findings. The first of these is that about 12% of the MIEP participants did not complete the programme and, although the initial response to the request to participate in the study was very high, a considerable percentage of participants were lost in the follow-up. Importantly, those who were lost to follow-up showed no differences in baseline variables from those who remained in the study. Secondly, the sample size is relatively small. However, two out of the three expected interactions were found to be significant. This is noteworthy, because it is very difficult to detect interaction effects in naturalistic as opposed to experimental studies, particularly in small samples. McClelland and Judd estimated

that compromised statistical power renders approximately 90% of field studies vulnerable to type II errors (i.e. failing to reject a false null hypothesis) when investigating moderating effects [40]. The third limitation to the study is that patient ratings were used to assess the level of overprotection by their partner and these do not necessarily correspond with partner ratings or actual partner behaviour. Previous research has shown only moderate correlations between patients' and partners' perceptions of overprotection by partners (for example, [18,19]). This means that conclusions must be restricted to perceived overprotection.

This study provided further insight into associations between family factors and improvement in diabetes self-management by focusing on adult patients participating in diabetes education. The findings are in line with the idea that behaviour of the partner, and the patient's perception of this, is important, especially if adult patients with persistent diabetes problems are motivated and actively trying to improve their self-management routines. In future research, it would be important to examine whether these results can be replicated and whether similar results can be found with respect to newly diagnosed adult patients whose routines in dealing with diabetes still need to be established. Such research could determine whether these findings can be generalized to include a broader population of patients with diabetes. It would also be interesting to address the question as to why partners may engage in overprotective behaviour. Previous research has revealed that partners who feel that the patient has difficulties coping with the disease, and partners who feel burdened by caregiving or feel anger towards the patient, may be inclined to behave overprotectively [19,41,42].

Fisher and Weihs [8], who adopted a socio-ecological perspective towards the management of chronic disease, suggested that the focus of intervention should be shifted from the patient to the social setting in which disease management typically takes place. These findings support this idea. It may be that increasing partners' understanding of each other with respect to overprotective behaviour and the patient's evaluation of the usually well-intended behaviour of the partner may enhance patient's self-management. Therefore, it appears worthwhile investigating whether an intervention programme that has the aim of reducing overprotection by the partner, or the perception of this, can enhance diabetes self-management in patients participating in diabetes education.

Competing interests

None declared.

References

- 1 Dalewitz J, Khan N, Hershey CO. Barriers to control of blood glucose in diabetes mellitus. *Am J Med Qual* 2000; 15: 16–25.
- 2 Gonder-Fredrick LA, Cox DJ, Ritterband LM. Diabetes and behavioral medicine: the second decade. *J Consult Clin Psychol* 2002; 70: 611–625.

- 3 American Diabetes Association (ADA). Standards of medical care for patients with diabetes. *Diabetes Care* 2005; **28**: S4–S36.
- 4 Jacobson AM. The psychological care of patients with insulin-dependent diabetes mellitus. *N Engl J Med* 1996; **334**: 1249–1253.
- 5 Peyrot M, Rubin RR. Levels and risks of depression and anxiety symptomatology among diabetic adults. *Diabetes Care* 1997; **20**: 585–590.
- 6 Watkins KW, Connell CM, Fitzgerald JT, Klem L, Hickey T, Ingersoll-Dayton B. Effect of adults' self-regulation of diabetes on quality-of-life outcomes. *Diabetes Care* 2000; **23**: 1511–1515.
- 7 Fisher L, Chesla CA, Bartz RJ, Gilliss C, Skaff MA, Sabogal F *et al*. The family and type 2 diabetes: a framework for intervention. *Diabetes Educ* 1998; **24**: 599–607.
- 8 Fisher L, Weihs KL. Can addressing family relationships improve outcomes in chronic disease? Report of the National Working Group on family-based interventions in chronic disease. *J Fam Pract* 2000; **49**: 561–566.
- 9 Fisher L, Chesla CA, Skaff MM, Gilliss C, Mullan JT, Bartz RJ *et al*. The family and disease management in Hispanic and European-American patients with type 2 diabetes. *Diabetes Care* 2000; **23**: 267–272.
- 10 Trief PM, Himes CL, Orendorff R, Weinstock RS. The marital relationship and psychosocial adaptation and glycemic control of individuals with diabetes. *Diabetes Care* 2001; **24**: 1384–1389.
- 11 Trief PM, Sandberg J, Greenberg RP, Graff K, Castronova N, Yoon M *et al*. Describing support: a qualitative study of couples living with diabetes. *Fam Sys Health* 2003; **21**: 57–67.
- 12 Coyne J, Smith D. Couples coping with a myocardial infarction: contextual perspective on patient self-efficacy. *J Fam Psychol* 1994; **8**: 43–54.
- 13 Trief PM, Grant W, Elbert K, Weinstock RS. Family environment, glycemic control, and the psychosocial adaptation of adults with diabetes. *Diabetes Care* 1998; **21**: 241–245.
- 14 Schwartz LS, Coulson LR, Toovy D, Lyons JS, Flaherty JA. A biopsychosocial treatment approach to the management of diabetes mellitus. *Gen Hosp Psychiatry* 1991; **13**: 19–26.
- 15 Wearden AJ, Tarrier N, Davies R. Partners' expressed emotion and the control and management of type 1 diabetes in adults. *J Psychosom Res* 2000; **49**: 125–130.
- 16 Cardenas L, Vallbona C, Baker S, Yusim S. Adult onset diabetes mellitus: glycemic control and family function. *Am J Med Sci* 1987; **293**: 28–33.
- 17 Berkhuisen M, Nieuwland W, Buunk BP, Sanderman R, Viersma JW, Rispens P. Effect of high- versus low-frequency exercise training in multidisciplinary cardiac rehabilitation on health-related quality of life. *J Cardiopulm Rehabil* 1998; **19**: 22–28.
- 18 Hagedoorn M, Kuijer RG, Buunk BP, DeJong GM, Wobbes T, Sanderman R. Marital satisfaction in patients with cancer: does support from intimate partners benefit those who need it most? *Health Psychol* 2000; **19**: 274–282.
- 19 Kuijer RG, Ybema JF, Buunk BP, de Jong GM, Thijs-Boer F, Sanderman R. Active engagement, protective buffering, and overprotection: three ways of giving support by intimate partners of patients with cancer. *J Soc Clin Psychol* 2000; **19**: 256–275.
- 20 Chesla A, Fisher L, Skaff MM, Mullan JT, Gilliss CL, Kanter R. Family predictors of disease management over one year in Latino and European American patients with type 2 diabetes. *Fam Process* 2003; **42**: 375–390.
- 21 Trief PM, Ploutz-Snyder R, Britton KD, Weinstock RS. The relationship between marital quality and adherence to the diabetes care regimen. *Ann Behav Med* 2004; **27**: 148–154.
- 22 Trief PM, Wade MJ, Britton KD, Weinstock RS. A prospective analysis of marital relationship factors and quality of life in diabetes. *Diabetes Care* 2002; **25**: 1154–1158.
- 23 Keers JC, Blaauwwekel EE, Hania M, Bouma J, Scholten-Jaegers SMHJ, Sanderman R *et al*. Diabetes rehabilitation: development and first results of a Multidisciplinary Intensive Education Program for patients with prolonged self-management difficulties. *Patient Educ Couns* 2004; **52**: 151–157.
- 24 Keers JC, Bouma J, Links TP, Ter Maaten JC, Gans ROB, Wolffenbuttel BHR *et al*. One-year follow-up effects of diabetes rehabilitation for patients with prolonged self-management difficulties. *Patient Educ Couns* in press.
- 25 Snoek FJ, Visser A. Improving quality of life in diabetes: how effective is education? *Patient Educ Couns* 2003; **51**: 1–3.
- 26 Glasgow RE, Hiss RG, Anderson EM, Friedman NM, Hayward RA, Marrero D *et al*. Report of the Health Care Delivery Work Group: behavioral research to the establishment of a chronic disease model for diabetes care. *Diabetes Care* 2001; **24**: 124–130.
- 27 Acitelli LK, Antonucci TC. Gender differences in the link between marital support and satisfaction in older couples. *J Pers Soc Psychol* 1994; **67**: 688–698.
- 28 Hagedoorn M, Buunk BP, Kuijer RG, Wobbes T, Sanderman R. Couples dealing with cancer: role and gender differences regarding psychological distress and quality of life. *Psychooncology* 2000; **9**: 232–242.
- 29 Hagedoorn M, Sanderman R, Ranchor AV, Brilman EI, Kempen GJM, Ormel J. Chronic disease in elderly couples: are women more responsive to their spouses' health condition than men? *J Psychosom Res* 2001; **51**: 693–696.
- 30 McRae JA, Brody CJ. The differential importance of marital experiences for the well-being of women and men: a research note. *Soc Sci Res* 1989; **18**: 237–248.
- 31 Quirouette C, Gold DP. Spousal characteristics as predictors of well-being in older couples. *Int J Aging Hum Dev* 1992; **34**: 257–269.
- 32 Kiecolt-Glaser JK, Newton TL. Marriage and health: his and hers. *Psychol Bull* 2001; **127**: 472–503.
- 33 Keers JC, Links TP, Bouma J, Gans ROB, Ter Maaten JC, Wolffenbuttel BHR *et al*. Do diabetologists recognise self-management problems in their patients? *Diabetes Res Clin Pract* 2004; **66**: 157–161.
- 34 Wallston K, Stein M, Smith C. Form C of the MHLC scales: a condition-specific measure of locus of control. *J Pers Assess* 1994; **63**: 534–553.
- 35 Snoek FJ, Pouwer F, Welch GW, Polonsky WH. Diabetes-related emotional distress in Dutch and US diabetic patients: cross-cultural validity of the problem areas in diabetes scale. *Diabetes Care* 2000; **23**: 1305–1309.
- 36 Welch GW, Jacobson AM, Polonsky WH. The problem areas in diabetes scale. An evaluation of its clinical utility. *Diabetes Care* 1997; **20**: 760–766.
- 37 Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum, 1988.
- 38 Aiken LS, West SG. *Multiple Regression: Testing and Interpreting Interactions*, 3rd edn. Newbury Park: Sage Publications, 1991.
- 39 Coates VE, Boore JR. The influence of psychological factors on the self-management of insulin-dependent diabetes mellitus. *J Adv Nurs* 1998; **27**: 528–537.
- 40 McClelland GH, Judd CM. Statistical difficulties of detecting interactions and moderator effects. *Psychol Bull* 1993; **114**: 376–390.
- 41 Coyne J, Ellard J, Smith D. Social support, interdependence, and the dilemmas of helping. In: Sarason, B, Sarason, I, eds. *Social Support: an Interactional View*. Wiley series on personality processes. New York: John Wiley & Sons 1990, 129–149.
- 42 Thompson S, Sobolew-Shubin A. Overprotective relationships: a non-supportive side of social networks. *Basic Appl Soc Psychol* 1993; **14**: 363–383.